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BOAT HULL PERFORMANCE IMPROVING APPARATUS
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- (57) Claim

1. An apparatus for improving the performance of a boat hull, the apparatus comprising an elongate body arranged to abut and be secured to a side and/or the bottom of the hull with a longitudinal axis of the apparatus being substantially parallel to a longitudinal axis of the hull, the body having front and rear ends positioned, in use, with the rear end located in the vicinity of the stern of the hull and the front end located partway between the bow and the stern of the hull.

2. An apparatus as claimed in claim wherein the body is arranged to abut and be secured to said side and the bottom of the hull.

3. An apparatus as claimed in claim 2 wherein the body has a substantially longitudinal groove having first and second faces which meet at a common substantially longitudinal edge, the body being arranged such that, in use, the longitudinal edge abuts the hard chine of the hull and the first and second faces abut the side and bottom of the hull respectively.

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ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title: BOAT HULL PERFORMANCE IMPROVING
 APPARATUS

The following statement is a full description of this invention, including
the best method of performing it known to me:

GH&CO REF: P50310A/PJW

The present invention relates both to an apparatus for improving the performance of a boat hull and to a boat hull having improved performance resulting from use of a pair of the apparatus. The pair of apparatus may be
5 either secured to the hull subsequent to manufacture of the hull as an after-market fitment or may be incorporated as part of the hull during routine manufacture of the hull. In the latter case, the pair of apparatus may be integrally formed with the hull during
10 moulding operation or secured to the remainder of the hull during assembly of the hull from its component parts.

In a first aspect, the present invention provides an apparatus for improving the performance of a boat hull,
15 the apparatus comprising an elongate body arranged to abut and be secured to a side and/or the bottom of the hull with a longitudinal axis of the body being substantially parallel to a longitudinal axis of the hull, the body having a front end and a rear end
20 positioned, in use, with the rear end located in the vicinity of the stern of the hull and the front end located partway between the bow and the stern of the hull.

Generally speaking, there are two kinds of boat
25 hulls, namely planing hulls and displacement hulls. A pure planing hull lifts from the water under application of power to ride on a very narrow planing section at the stern of the hull; whereas, a pure displacement hull sits in the water displacing water as it is propelled through the water. In practice, most boats have a hull
30 configurations which have characteristics of both pure planing hulls and pure displacement hulls and are thus a compromise between the two. For example, in many pleasure boats there is a V-shaped displacement type
35 cutwater forward and a flat planing area aft with such boats sometimes referred to as having semi-planing or semi-displacement hulls depending upon the predominant characteristics of the hull. The present invention can

be utilised in improving the performance of hulls having planing and/or displacement characteristics but is of particular use in conjunction with hulls having a predominant planing characteristics. Irrespective of the type of hull, use of a pair of apparatus according to the present invention is believed to provide improved buoyancy and greater stability at rest due to an increase in the beam at the rear of the hull in a manner similar to increased stability resulting from the use of outriggers.

In use, the apparatus abuts and is secured to a side and/or the bottom of the hull on both the port and the starboard sides of the hull. The positioning of the apparatus will be dependent upon the type and specific shape of the hull. In a hull having strong planing characteristics, the sides and bottom of the hull meet at the chine with the angle between the side and the bottom (the chine angle) having a strong influence on planing characteristics. A pure planing hull would typically have a flat bottom and vertical sides with the chine angle being 90° . As the planing characteristics of the hull lessen the chine angle increases. It is preferred that the apparatus of the present invention abuts and is secured to both the side and the bottom of the hull and as such, spans the chine. Hulls in which a side and the bottom meet at the chine are referred to as having a hard chine. Some hulls have so-called non-trip chines where side and the bottom do not actually meet but are joined by a step. Preferably, the apparatus is arranged such that, irrespective of the configuration of the chine, in use the apparatus abuts and is secured to both a side and a bottom of the hull.

For hulls having a hard chine, it is preferred that the body of the apparatus has a substantially longitudinal groove which has first and second faces which meet at a common substantially longitudinal edge. The body is thus arranged such that, in use, the longitudinal edge abuts the hard chine of the hull and

the first and second faces abut the side and bottom of the hull respectively. Further, it is preferred that first and second flanges extend from the first and second faces respectively such that in use, the first and second
5 flanges abut the side and bottom of the hull respectively.

When used on a hull having planing characteristics, at least preferred embodiments of the present invention can reduce the displacement of water thus providing
10 better economy, can result in the hull planing at a lower speed, can provide more rapid planing under power. These advantages are believed to result from water being directed under the boat when the boat is under power rather than passing along the sides of the hull. To
15 assist in directing water under the hull, it is preferred that the rear end of the body of the apparatus is of greater cross-sectional area than the front end. More preferably, the cross-sectional area of the body is substantially constant along a portion of the length of
20 the body from the rear end towards the front end and thereafter the body tapers towards the front end.

In use, the rear end of the body is located in the vicinity of the stern of the hull. The rear end may be positioned somewhat forward of the stern or project
25 rearwardly of the stern. Preferably however the rear end has a flat face which, in use, meets an edge of the hull where the transom meets the bottom.

The shape and size of the apparatus will be dependent upon the shape and the size of the hull to
30 which it is to be secured. However, the apparatus will typically have a length in the order of 20-40%, preferably 25-35% of the length of the hull. Preferably, the apparatus tapers to a point or an area of small cross-sectional area at its front end and the rear end is
35 preferably flat. The face of the flat rear end may have a variety of shapes including triangular, quadrilateral, polygonal, circular, elliptical, eccentric and tear-shaped.

The apparatus can be manufactured from a variety of materials including fibreglass, wood and metal but is preferably manufactured from marine grade aluminium. Various securing means can be used for securing the apparatus to a hull including bonding, riveting, screwing, bolting, welding or a combination thereof with the securing means depending to some extent on the materials from which the hull and apparatus are manufactured. For example, where the apparatus and hull are manufactured from marine grade aluminium, the apparatus can be welded directly to the hull. Where the apparatus is manufactured from marine grade aluminium and the hull is manufactured from fibreglass, the apparatus is preferably secured to the hull by stainless steel screws or stainless steel nuts and bolts with a bead of waterproof compound located between the apparatus and the hull.

The apparatus may be either solid or hollow but is preferably hollow as this reduces drag under power. More preferably, the apparatus is hollow and includes means for introducing water into and draining water from the apparatus. Typically the means will comprise a bung located in the rear end of the apparatus and a breather located in an upper portion of the body. With the bung and the breather open and the boat at rest, the apparatus will fill with water thereby improving stability at rest. Under power, water drains from the apparatus through the bung with a consequential improvement in running performance.

Two preferred embodiments of the invention will now be described by way of example only, with reference to the accompanying drawings in which:-

Figure 1 is an underside perspective view from the rear of a boat hull to which is secured a pair of apparatus according to a first preferred embodiment of the present invention,

Figure 2 is a top side perspective view from the front of the port side of the boat hull illustrated in

Figure 1,

Figure 3 is a rear elevation of the boat hull illustrated in Figure 1,

Figure 4 is an inverted plan view of the boat hull illustrated in Figure 1,

Figure 5 is an underside perspective view from the rear of a boat hull to which is secured a pair of apparatus according to a second preferred embodiment of the present invention,

Figure 6 is a top side perspective view from the front of the port side of the boat hull illustrated in Figure 5,

Figure 7 is a rear elevation of the boat hull illustrated in Figure 5,

Figure 8 is an inverted plan view of the boat hull illustrated in Figure 5, and

Figure 9 is a transverse cross-section through a portion of the starboard side of the boat hull and one of the apparatus illustrated in Figure 5.

Referring firstly to Figures 1-4, the boat hull 10 has port side starboard sides 11 and 12 which meet the bottom 13 at hard port and starboard chines 14 and 15 respectively and a transom (stern) 17. A pair of apparatus 18 and 19 are secured to the hull 10; apparatus 18 being secured to port side 11 and bottom 13 and apparatus 19 being secured to starboard side 12 and bottom side 13. Apparatus 18 and 19 are mirror images of one another and for the clarity of the Figures reference will be made predominantly to apparatus 18.

Apparatus 18 comprises an elongate body 20 having a front end 21 and a rear end 22 and is positioned with the rear end 22 located in the vicinity of stern 17 and the front end located partway between the stern 17 and the bow (not shown) of the hull.

Longitudinal axes A-B and C-D of apparatus 18 and 19 respectively are substantially parallel to longitudinal axis E-F of hull 10.

The body 20 has a longitudinal groove which has

first and second faces 23 and 24 which meet at a common substantially longitudinal edge 25 abutting the hard chine 14 and faces 23 and 24 abutting port side 11 and bottom 13 respectively. Flanges 26 and 27 extend from faces 23 and 24 to abut port side 11 and bottom 13 respectively with the apparatus 18 being secured to the hull 10 by stainless steel bolts 28 and nuts (not shown) with a bead of water proofing compound (not shown) located between the flanges 26 and 27 and the port side 11 and bottom 13 respectively.

The body 20 is of substantially constant cross-sectional area from rear-end 22 to a point 29 whereafter the body 18 tapers towards front end 21 with this arrangement believed to result in a water being directed under the bottom 13 when the hull 10 is being propelled forward rather than the water passing along the sides 11 and 12 of the hull as schematically illustrated in Figure 4.

Figure 3 illustrates the hull 10 is water 30 with the presence of apparatus 18 and 19 increasing the stability of the hull 10 by reducing movement in the direction of the arrows.

The apparatus 18 and 19 are hollow and are manufactured by bending and welding sheet marine grade aluminium. A bung 31 is located in the rear-end 22 with a breather 32 located in an upper portion of the body 20. When the hull is at rest with the bung open, water enters the body 20 to increase the stability of the hull. When under power, the bung 31 and breather 32 are positioned such that water drains from the body 20 thereby reducing drag.

The embodiment illustrated in Figures 5-9 is very much the same as that illustrated in Figures 1-4 and to avoid repetition description, like numerals have been utilised. The apparatus of the second preferred embodiment differ from those of the first preferred embodiment in two ways.

Firstly, the chine of the hull illustrated in

Figures 5-9 is not a hard chine with the result that the apparatus of the second embodiment are shaped to accommodate the different chine shape.

- 5 Secondly, the apparatus of the second embodiment present a generally flatter configuration to the water and would typically be utilised on a hull having more predominant planing characteristics than those of the first preferred embodiment.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An apparatus for improving the performance of a boat hull, the apparatus comprising an elongate body arranged to abut and be secured to a side and/or the bottom of the hull with a longitudinal axis of the apparatus being substantially parallel to a longitudinal axis of the hull, the body having front and rear ends positioned, in use, with the rear end located in the vicinity of the stern of the hull and the front end located partway between the bow and the stern of the hull.
2. An apparatus as claimed in claim 1 wherein the body is arranged to abut and be secured to said side and the bottom of the hull.
3. An apparatus as claimed in claim 2 wherein the body has a substantially longitudinal groove having first and second faces which meet at a common substantially longitudinal edge, the body being arranged such that, in use, the longitudinal edge abuts the hard chine of the hull and the first and second faces abut the side and bottom of the hull respectively.
4. An apparatus as claimed in claim 3 wherein first and second flanges extend from the first and second faces respectively such that, in use, the first and second flanges abut the side and bottom of the hull respectively.
5. An apparatus as claimed in any one of the preceding claims wherein the rear end is of greater cross-sectional area than the front end.
6. An apparatus as claimed in claim 4 wherein the cross-sectional area of the body is substantially constant along a portion of the length of the body from the rear end towards the front end and thereafter the body tapers towards the front end.
7. An apparatus as claimed in any one of the preceding claims wherein the rear end has a flat face which, in use, meets an edge of the hull where the transom meets the bottom.

8. An apparatus as claimed in any one of the preceding claims wherein the body has a length in the range of 20-40% of the length of the hull.

5 9. An apparatus as claimed in any one of the preceding claims wherein the body is hollow.

10. An apparatus as claimed in any one of the preceding claims wherein the body is manufactured from marine grade aluminium.

10 11. An apparatus as claimed in claim 9 or claim 10 wherein the body further comprises means for introducing water into and draining water from the apparatus.

15 12. An apparatus as claimed in claim 10 wherein the means for introducing water into and draining water from the apparatus comprises a bung located in the rear end and a breather located in an upper portion of the body.

13. An apparatus for improving the performance of a boat hull substantially as hereinbefore described with reference to the accompanying drawings.

20 14. A boat hull incorporating a pair of apparatus as claimed in any one of the preceding claims.

DATED this 8th day of December 1994

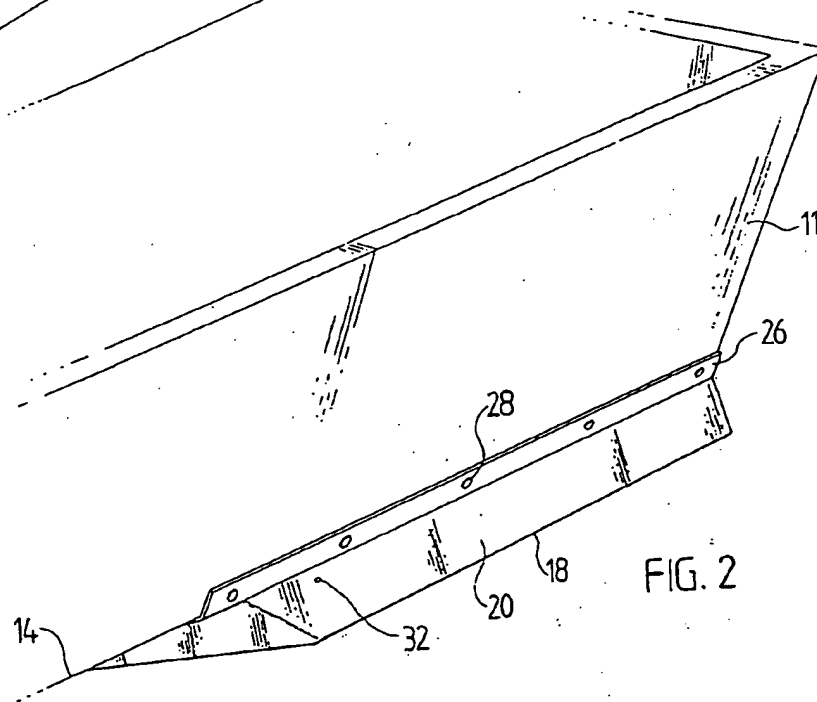
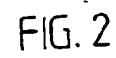
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By his Patent Attorneys
GRIFFITH HACK & CO.

ABSTRACT

An apparatus for improving the performance of a boat hull, the apparatus comprising an elongate body arranged to abut and be secured to a side and/or the bottom of the hull with a longitudinal axis of the apparatus being substantially parallel to a longitudinal axis of the hull, the body having front and rear ends positioned, in use, with the rear end located in the vicinity of the stern of the hull and the front end located partway between the bow and the stern of the hull.

FIG. 1



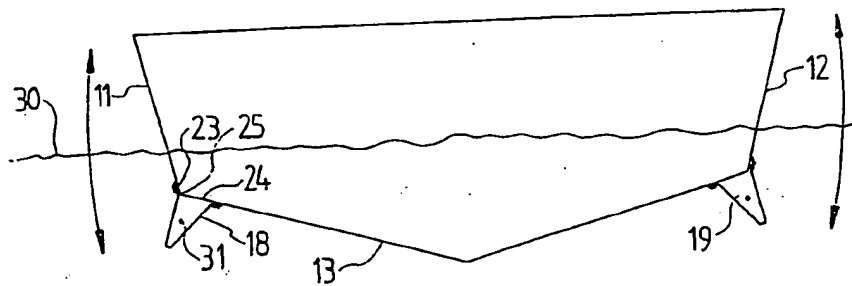


FIG. 3

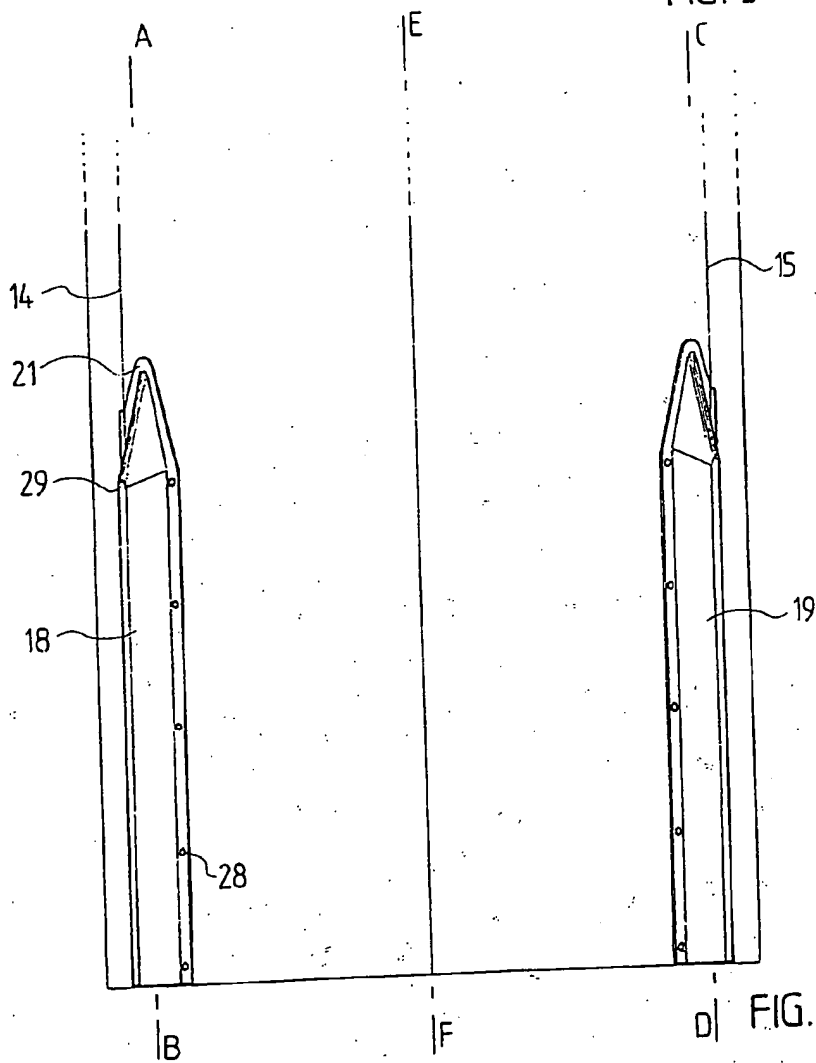


FIG. 4

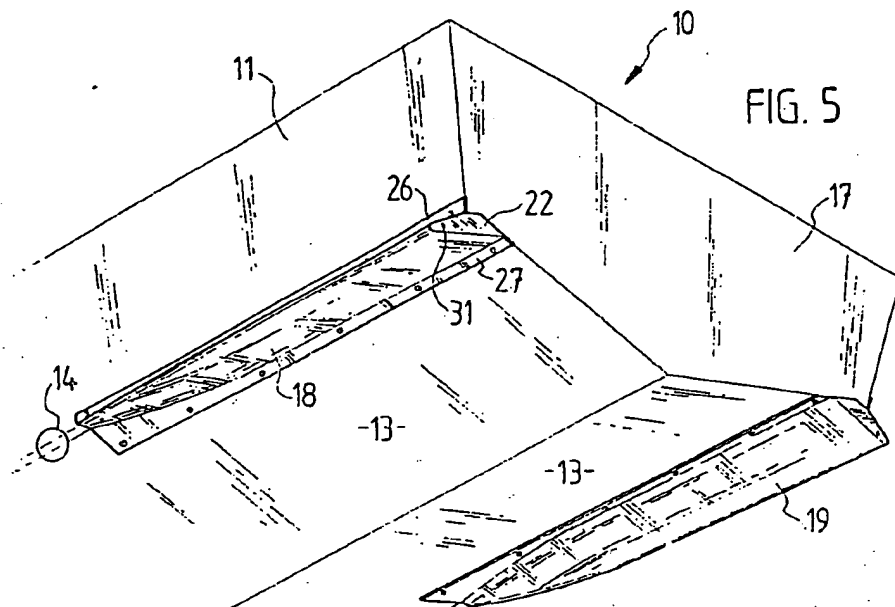


FIG. 5

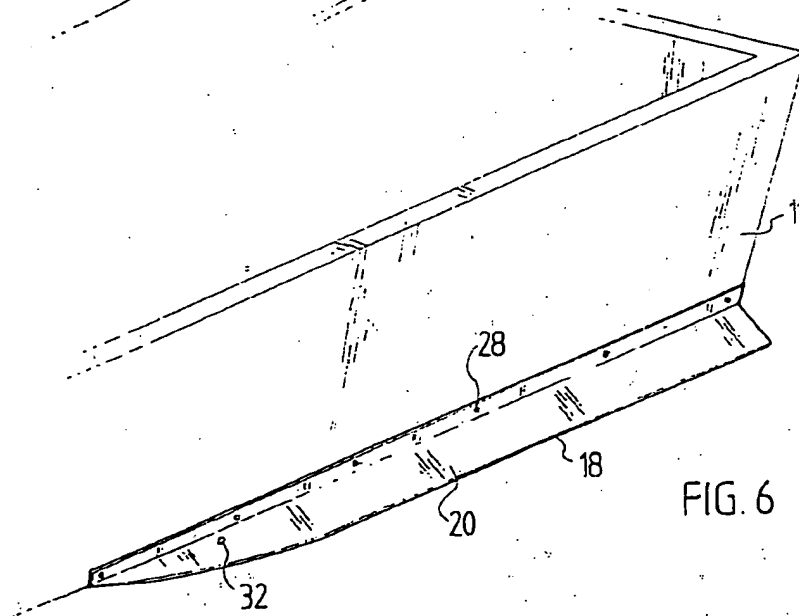


FIG. 6

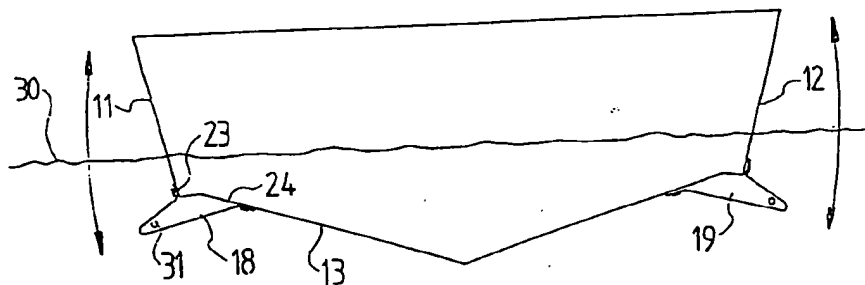


FIG. 7

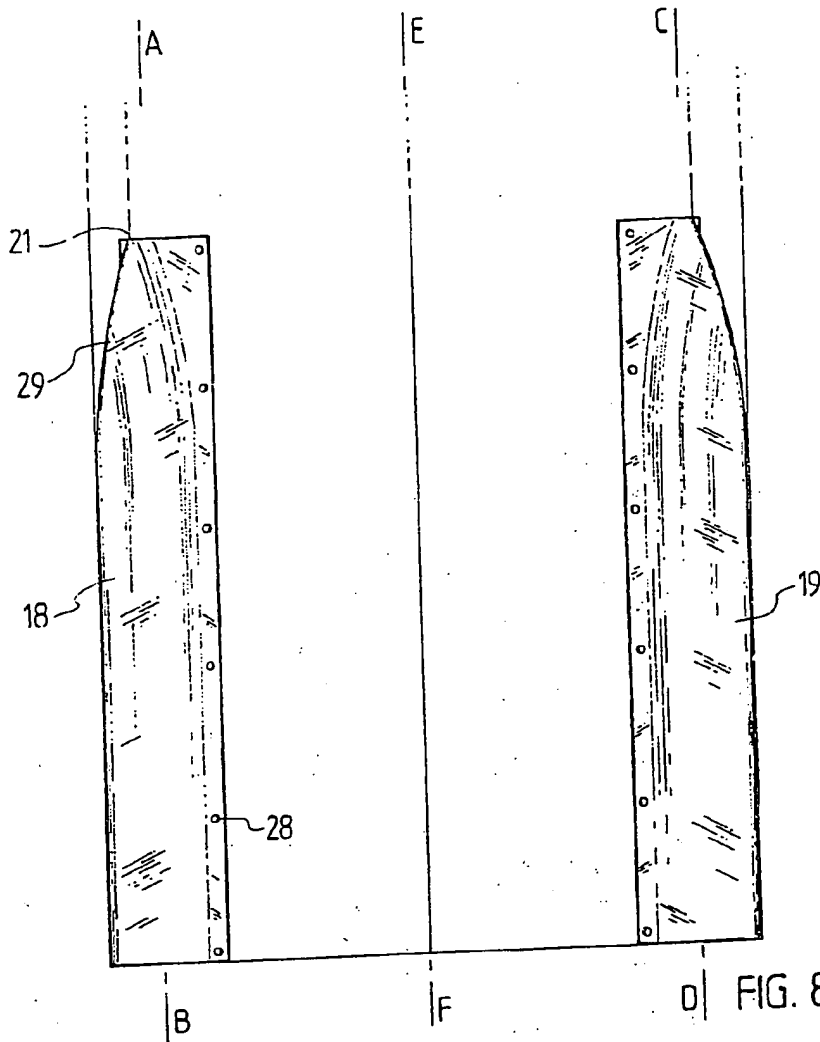


FIG. 8

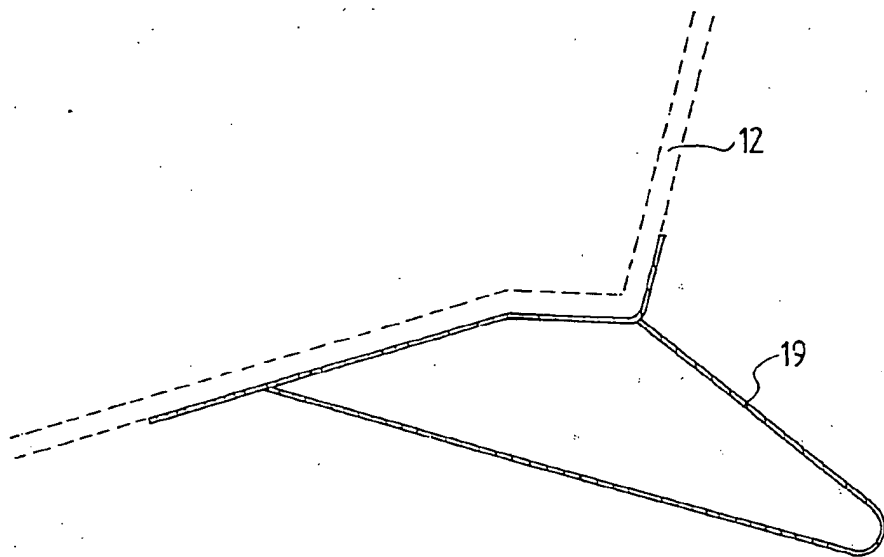


FIG. 9